

CLAIMS:

1. A multi-resolution inspection system comprising:
a first scanning system having a first resolution, wherein the first scanning system is operable to perform a first scan of a surface area of an object to identify a location of a surface abnormality in the object; and
a second scanning system having a second resolution, the second resolution being a higher resolution than the first resolution, wherein the second scanning system is operable to receive the location of the surface abnormality from the first scanning system and to define a region of the object around the location of each surface abnormality to automatically scan with the second scanning system.
2. The system of claim 1, wherein the second scanning system defines a specific region around each location of a plurality of surface abnormalities provided by the first scanning system to automatically scan with the second scanning system.
3. The system of claim 1, wherein the region scanned by the second scanning system is smaller in area than the surface area of the object scanned by the first scanning system.
4. The system of claim 1, wherein the first scanning system comprises a machine vision system.
5. The system of claim 1, wherein the second scanning system comprises a machine vision system.
6. The system of claim 1, wherein the second resolution is at least ten times smaller than the first resolution.
7. The system of claim 1, wherein the second resolution is at least ten times smaller than a tolerance for a surface feature to be identified as a defect.

8. The system of claim 1, wherein the second scanning system is operable to provide two-dimensional data representative of the region of the object.

9. The system of claim 1, wherein the second scanning system is operable to provide three-dimensional data representative of the region of the object.

10. The system of claim 9, wherein the second scanning system is operable to provide a three-dimensional graphical representation of the region of the object.

11. The system of claim 1, wherein the first scanning system scans the surface area of the object at a first speed and the second scanning system scans the defined region of the object at a second speed, the first speed being greater than the second speed.

12. The system of claim 1, comprising a third scanning system operable to produce a three-dimensional graphical representation of the defined region of the object.

13. The system of claim 12, wherein the third scanning system comprises a laser scanner.

14. The system of claim 1, wherein the first scanning system is coupled to control circuitry, wherein the control circuitry identifies a surface abnormality by comparing the first resolution scan with a reference image of the surface area of the object.

15. The system of claim 1, wherein the first scanning system enables a user to define the size of a surface variation to direct the first scanning system to identify as a surface abnormality.

16. A method of inspecting a part comprising:

directing a first scanning system to automatically perform a first scan of an object using a first resolution to identify a location of a possible surface defect;

coupling the location of a possible surface defect to a second scanning system;
and

directing the second scanning system to automatically perform a second scan of a defined portion of the object at the location of the possible surface defect using a second resolution that is a higher resolution than the first resolution.

17. The method of claim 16, wherein directing the second scanning system comprises directing the second scanning system to produce a two-dimensional representation of the defined region of the object at the location of the possible surface defect.

18. The method of claim 17, comprising establishing a dimensional parameter of the possible defect based on the two-dimensional data and comparing the dimensional parameter to an acceptable tolerance for the dimensional parameter stored in the system, wherein the system automatically identifies the possible defect as a defect when the dimensional parameter exceeds the tolerance for the dimensional parameter.

19. The method of claim 17, comprising scanning the defined region with a third scanning system when the area of the possible defect exceeds the defined area of a defect.

20. The method of claim 19, comprising providing three-dimensional parameters of the defined region of the object.

21. The method of claim 16, wherein directing the second scanning system comprises directing the second scanning system to map a three-dimensional profile of the defined region of the object at the location of the surface defect.

22. The method of claim 16, wherein coupling the location of the surface defect comprises comparing the first resolution scan obtained from the first scanning system with a reference image of the object to identify the location of a possible surface defect.

23. An automated inspection system, comprising:

a first scanning system operable to automatically scan a first surface area of an object using a first scanning resolution to identify a location of a surface abnormality; and

a second scanning system operable to receive the location of the surface abnormality from the first scanning system and to automatically perform a three-dimensional scan of the object at the location of the possible defect.

24. The system of claim 23, wherein the second scanning system has a second scanning resolution that is smaller than the first scanning resolution.

25. The system of claim 24, wherein the second resolution is at least ten times smaller than the first resolution.

26. The system of claim 23, wherein the first scanning system comprises a machine vision system.

27. The system of claim 23, wherein the second scanning system comprises a machine vision system.

28. The system of claim 23, wherein the first scanning system is coupled to control circuitry, wherein the control circuitry identifies the surface abnormality by comparing the first resolution scan with a reference image of the surface area of the object.

29. The system of claim 23, wherein the first scanning system scans the surface area of the object at a first speed and the second scanning system scans the defined region of the object around the location of the surface abnormality at a second speed, the first speed being greater than the second speed.